

LETTER

FROM

THE SECRETARY OF WAR,

IN RELATION TO

Leases of Lead Mines and Salt Springs.

FEBRUARY 22, 1826.

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WASHINGTON:

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1826.

DEPARTMENT OF WAR,*February 18th, 1826.*

SIR: Since the report of this Department, on the resolution of the Senate, of the 15th December last, relating to leases for Lead Mines and Salt Springs, communicated by the President to the Senate, on the 7th instant, the Colonel of Ordnance has made an additional report in relation to Lead Mines, which contains much valuable information in addition to the report on the subject already rendered; and I have, therefore, the honor of communicating it, herewith, for the consideration of the Senate.

I have the honor to be

Your obedient servant,

JAMES BARBOUR.

The VICE PRESIDENT and PRESIDENT

Senate United States.

ORDNANCE DEPARTMENT,

Washington, 7th February, 1826.

SIR: Lieutenant Thomas, the officer employed in superintending the operations of the United States' lead mines, in the Western country, has made a full report upon the subject generally. The report contains much valuable information concerning the lead mines, and demonstrates their great value. It also exhibits general and just views respecting the management of them; and I beg leave to submit it for your examination.

It is due to Lieutenant Thomas, on this occasion, to state, that the industry and ability which he has manifested in the conduct of this business, since he has had the superintendence of it, entitles him to commendation; and I take great pleasure in expressing this opinion of his merits.

I have the honor to be, respectfully,
Your obedient servant,

GEO. BOMFORD. *Brev. Col.*

On Ordnance Service.

The Hon. JAMES BARBOUR,
Secretary of War.

WASHINGTON, D. C. *January, 1826.*

To Col. GEORGE BOMBORD,
U. S. Ordnance.

SIR: I have reported to you, from time to time, my transactions whilst superintending the United States' lead mines and mineral lands in the State of Missouri, and at the river Au Ferre, near the north boundary of the State of Illinois; but, from the desultory manner the information has been transmitted, and its having been chiefly confined to business transactions arising under leases, I deem it requisite to make a report of a more general nature, embracing the subject in all its details.

The lead mines of Missouri, we are informed, in a view of them published by Mr. Schoolcraft, were discovered about a century ago, by Renault and others, in the employ of the French "Company of the West," who wrought them extensively during the time this part of the country was under their control, a period of about twenty-four years, after which individuals continued to work at the mines, until Louisiana passed into the possession of Spain, in 1769.

Some grants of mining privileges were received by individuals, from the Spanish authorities, but it was customary to permit all residents of the country to dig lead ore in any part of the king's domain, which was not granted to individuals. This was the situation of the mine country when taken possession of by the United States, in March, 1804.

The fame of the lead mines was well known to the Government at the period we acquired the country, and we find, that, as early as December, 1805, they are noticed in the message of the President to Congress.

In 1807, the law directing the reservation of the mines from sale, and authorizing them to be leased to individuals, was enacted. It has frequently been observed that the power of leasing was of little use, as no provision was made for the appointment of an agent to attend to it. This duty was attached to the office of the recorder of land titles at St. Louis, a distance of seventy miles from the principal seat of the mines. I am not aware of the extent of the proceedings in this business by the recorder, but the following extract of a report made by him to the Commissioner of the General Land Office, in 1816, extracts from a report made by the late Moses Austin, Esq. to the same, from the work of Mr. Schoolcraft, and the letters of individuals, will render some idea of the state of the mine country, from 1807 to 1824, a period of seventeen years.

In 1816, the recorder writes to the Commissioner, (Mr. Meigs,) on the subject of intrusions by individuals, on public mineral lands. "With unexampled lenity, however, the Government has not only forborne to inflict those penalties, provided by law, but has left persons thus offending, in the undisturbed possession of the most valuable mines in the county of St. Genevieve. From hence, it has arisen that your agents have possession of but a small portion of those lead mines and salt springs, to which you have unquestionable titles. I know of none, except those leased to Partenay, of which you are already sufficiently informed, and a recent discovery near Mine a Burton; of which I have put his son in possession. A settler in the neighborhood, who has no survey, and who expects 500 arpens (of land) from your bounty, on account of his improvement, has instituted a suit for that trespass. Such is the situation of your agents here. I should not be surprised, if, in a little while, we were fined and imprisoned by those for whose punishment the intrusion acts were intended. Speculative mischiefs should be suppressed in their origin; they acquire accession and strength every day they are tolerated; the confederacy extends itself, the interest becomes diffused and ramified, and he who at first thought of no more than a momentary advantage, begins to plead principles in support of his own violations of law."

1816. In answer to the Commissioner, Mr. Austin writes: "Intrusions, permanent or transitory, I do not think come within my province to point out; that there are intruders on public lead mines, is true; that the public have suffered some thousands of dollars an-

"nually, is an unquestionable fact, but these facts may be drawn from the officer charged with the care of the domain."

1818. Schoolcraft, in his view of the mines, states: "When a discovery of lead has been made, the miners from the neighboring country have flocked to it, and commenced digging *as usual*, no one troubling himself about a lease, and thus the provisions of the law have been, in a great measure, disregarded."

1822. In a letter addressed to the ordnance office, by Mr. John Perry, of Potosi, Missouri, he states: "When a person makes a discovery of ore, either on public or private land, all the miners in the neighborhood gather in, and each man marks off a hole, four or five feet square, from which he claims twelve feet (superficial) in every direction, taking care not to interfere with each other; and for each 1000 pounds of mineral, if raised on private land, the proprietor pays 400 pounds of lead, if raised on *public* land, the miner sells it at the rate of 460 pounds of lead for each 1000 pounds of mineral." Mr. Perry was informed he could not, at that period, obtain a lease, and he replies: "In the mean time, I should be glad to be put in possession of the land, by permit or otherwise; should it be delayed until a formal lease is forwarded, the mineral will be dug out so that the land will be scarcely worth leasing. I should feel myself as much bound for the rent by a permit to take possession, as if I should receive a lease."

Such was the state of the public mines in Missouri, upon my arrival there, in the latter end of November, 1824. Notwithstanding I avoided interfering, in any manner, with such of the mines to which there was a shadow of a private claim, a large population having had undisturbed possession of all the public mines for a number of years, appropriating the whole produce to their private benefit, it was not an easy matter to dispossess them, nor is it yet entirely effected. It is, however, but doing justice to a great majority of the mine population to state, that those who yet adhere to the practice of trespassing upon the public mines, are the most worthless and abandoned part of the community, and are equally disposed to plunder the private, as public mines. Under such embarrassments, my whole operations had to be carried on, and I am much indebted to the firm conduct and uninterrupted support, in *all* my movements, received from the lessees of the first mine I leased, (Messrs. *Wm. M. & John Perry*, of the town of Potosi.) Their example had much influence upon the people of the district. They are among the oldest and most respectable inhabitants of the mine country.

Situation and extent of the Mine Country.

The district of country in Missouri, in which lead mines are at present wrought, is situated, may be stated at about fifty miles square, taking the town of Potosi as a centre. Potosi is situated in the county of Washington, in latitude 38° North, about 30 miles West of the Mississippi River; and 40 miles South of the river Missouri, distant

from} St. Louis about 70 miles. There is but one mine at present wrought, out of the bounds of this district, that of La Motte, situated about 35 miles South-east of Potosi. That lead ore exists over a larger space than the above bounds, I have every reason to believe, but at present I shall confine my observations to this district.

The bounds above stated comprise 2,500 square miles. This land has been surveyed, and the greater part of it has been offered for sale; a part has been purchased by individuals, another portion is held under Spanish and French grants, donations from the United States, &c. &c. The land thus owned, is principally confined to that best adapted to agricultural purposes, the cause for which is obvious: the Spanish authorities permitted the inhabitants to dig lead ore on any part of the King's domain; the United States' Government have heretofore omitted to prevent digging on public mineral land, and at the same time forbidden the sale of it.

The plat of survey, annexed to this report, will show the position of the mines, or rather, diggings, where lead ore is obtained under the leases from the United States. It will be observed, they are scattered over the country; the intermediate land will produce much ore, when properly searched.

The reservations from sale, on account of indications of lead ore, are chiefly in the vicinity of Potosi. The first of them were made upon the reports of the surveyors, and of others who knew the facts, and stated them to the Registers of the land offices.

On this subject, in the report made by the Commissioners of the General Land Office, (George Graham, Esq.) in 1824, it is stated: "The only measures which the Government has yet taken to discover the extent to which minerals may exist on the public lands, are, the instructions given to the Surveyor General to note, on the official returns of surveys, all appearances indicative of their existence. Agreeably to general provisions of the laws regulating the sale of public lands, reservations have been made, by the Registers of the proper land offices, of those lands on which mineral appearances are indicated by the returns of the Surveyor General; but, inasmuch as the observations of the Surveyor must necessarily be restricted to the immediate vicinity of the lines of survey, consequently evidences of the existence of minerals must be partial and indefinite; and, in excluding from sale the lands supposed to afford mineral, the Register of the land office, in the absence of definite information, must act according to the best of his judgment, from the means afforded him. Under such circumstances, it may reasonably be expected, that many tracts of productive mineral land may have been omitted to be reserved, and that many tracts of inferior mineral land may have been reserved."

After observing that a list of the reserved lands was not in possession, the report goes on to state: "I have caused the lands which have been sold in those townships, up to the date of the latest returns, to be designated by the yellow color, in order to give an idea of the extent of the reservations, as it is presumable that a very

“great portion of what remains uncolored (unsold) has been excluded from sale on account of its minerals.”

This conclusion was very natural, from the evidence in possession, yet far from being correct. On examining the plats of surveys in the offices of the Registers, I discovered that the township lines, (noted in the report of the Commissioner as being the place of principal reservations then positively known) constituted nearly all the reservations on account of lead ore, in the mine district. A personal examination of the country disclosed the fact, that the persons who surveyed the township lines had noted mineral appearances, and those who surveyed the section lines had omitted to do so. It was thus to be seen, that, in the vicinity of the exterior lines of entire townships, the land had been reserved, and not a single acre in the interior. I obtained authority, from the Commissioner of the General Land Office, to report to the Registers such land as contained signs of lead ore, and had it reserved from sale. The extent of all these reservations is shown on the plat accompanying this report. The reservations are large, but believing it for the interest of the public that all the mineral land should at present be excluded from sale, I have not hesitated to make reservations where my observations or information demonstrated mineral appearances. Upon this point, Mr. Austin, in the report before quoted, after enumerating about thirty mines or diggings, observes: “The intervening land between the diggings herein named, will undoubtedly produce mineral in great abundance, and I have no doubt, with proper inducements, lead ore within this circumference will be found, equal in goodness and extent, to any of the mines or diggings now opened or worked.”

1816. Every year's experience has proven the correctness of Mr. Austin's statement. The mines at this time, (1825,) have more than doubled in number since 1816. Almost every month adds to the number; and, from the advantages to be derived by individuals under the leases of public mines, the searches for discoveries will hereafter be principally upon public land.

Face of the Country.

Upon crossing the Mississippi River at Herculaneum, (thirty miles below St. Louis,) we find the bank composed of perpendicular rocks, from eighty to two hundred feet high. This rock is a secondary limestone, containing marine and other remains; under the limestone is a red compact sandstone; this latter is on a level with the river. Upon ascending the bluff and advancing into the country, we find it broken and hilly. At the distance of four miles, the sandstone, which, at the bank of the river was overlaid by limestone upwards of an hundred feet, is at the surface. It is a remarkable place, being an almost perpendicular wall of rock, forty feet high, and several miles in circumference. After passing this place, the rock changes from a secondary to a primitive limestone, destitute of remains of any kind. Here commences the lead mine country, and over its whole extent one common feature

is observed: a broken, hilly surface, the soil a poor clay, intermixed with shivers of flint; covered with a scanty growth of timber; on the hills, principally oak; on the bottoms, it is various. There is an abundance of fine springs. Upon examining the *map* which accompanies this report, it will be seen that in the mine country the following streams have their heads: the Black, St. Francis, Gasconade, and Merrimack Rivers. They flow to the E., N. W. and South. This denotes the elevation of the mine district. I am of opinion the town of Potosi is three hundred feet above the level of the Mississippi River. The rapidity of the streams which rise in so hilly a country, afford many places well adapted to erect machinery, and they are fed by the most abundant and never-failing springs. I have observed the soil was generally a poor clay; there are exceptions, and in small detached bodies very good land may be found. South of Potosi is a ridge of mountains, where the rock formation is different from the rest of the country, being granite and sandstone. In the valleys of this vicinity are bodies of excellent land. Limestone is found composing the base of the whole country; it is invariably found at greater or less depths, and in numerous places is found at the surface. In high, rocky bluffs, the veins of lead ore may be sometimes traced in these bluffs, where the water has worn channels.

With respect to timber, it may be observed it is tolerably plenty; and, where the fires are kept out, it is increasing in quantity. Places entirely destitute of it twenty years ago, are now covered with thriving young timber. South and West of Potosi, is a range of pine timber, of excellent quality and very large growth.

Method of obtaining the ore of lead.

This is merely to dig pits in the earth; the ore is found in detached masses, from an ounce to several hundred pounds weight. It is the common galena, and is frequently intermixed with iron pyrites and sulphate of barytes; sometimes it is found free from any foreign substance, being very pure, yielding seventy per cent. (in the large way) when smelting.

When the rock is reached, the digger generally abandons the place; if, however, the prospect of obtaining ore is tolerable, the rock is penetrated, especially if it is of the softer kind. The digger works upon his own account, and, consequently, seeks the ore where least labor is required. When the ore is found in the rock it is in regular veins, sometimes adhering to the rock, at others, loose in the fissures, in a dark colored substance, apparently an oxide of lead and earth intermixed. The diggings in the immediate vicinity of Potosi, are generally in the clay; the rock has put a stop to most of the digging. At mine a Joe, (noticed on the plat,) the ore is found in regular veins, and at several other mines in the same vicinity. The pits are seldom more than forty feet deep, some few exceptions. Sometimes the digger, if the soil is loose, *cribs* the pit with small timber; but, generally, no precautions are taken.

It is thus seen that the local term "diggings," is more appropriate than "mines," when applied to the places where lead ore is obtained in Missouri at the present time. The only implements are a few spades, picks, and shovels, with a common windlass and tub to remove the earth, stones, and water, from the pits.

As before stated, the miners work upon their own account. They sell the ore to the smelters, who pay them the value of 800 wt. of lead for each ton of ore they deliver.

Of the smelting.

I have but to state that it is done in a negligent and wasteful manner, in furnaces built of limestone, of a construction peculiar to the country. There is much fuel consumed, and the loss in this branch of the business is considerable; and, as it benefits no one, it should be obviated as early as practicable. The *average* yield may, at the present time, be about sixty-two per cent.

Quantity of Lead produced.

On this point I have no certain information, except as respects the public mines *under lease*, the amount at those in Missouri during 1825 will be about 1,200,000 lbs.; all others, from the best information I could obtain, about three millions; at Fever river about one million; in all, five millions two hundred thousand pounds, which is not one-half the amount required to meet the demand of the country, (estimated at twelve millions.)

Schoolcraft has estimated the amount made in Missouri from 1803 to 1818 at fifty-five millions of pounds; from 1818 to 1824 at least four millions per annum has been made, which would make seventy-nine millions of pounds since the United States acquired Louisiana. If we take one-half of this amount as the produce of the public mines, (certainly a very low estimate,) one-tenth of it as a rent would amount to about four millions of pounds; this, at the present time, at 5½ cents, would amount to about \$220,000, or eleven thousand dollars per annum, which has been lost to the Government. In 1824 the mines of Missouri paid no rent to the United States; in 1825 about \$7,000 worth of lead will have been received; and if the present system is pursued with vigor, in 1826 the amount will be more than double that of 1825.

Manufacture of Shot.

On the top of the rocky cliffs on the bank of the Mississippi, small wooden towers are erected, and the shot are formed by dropping to the foot of the cliff: a small building is here erected to polish, assort, &c.: the whole expense less than \$1,500. These manufactories can supply the whole country, and large quantities for exportation. I am informed that neither of the factories could obtain sufficient lead during the past season, the demand for the Eastern market was so great.

Profits to Smelters and Miners.

On this point I find it difficult to obtain an accurate estimate, the Smelters are unwilling to disclose the amount of their profits; the data I have, however, will afford a tolerable correct idea of the business.

1816. In a statement, furnished by the late Judge Jones, of Potosi, to Mr. Bates, then Agent for the United States, we find the following calculation of the cost of smelting two hundred and seventy tons of lead ore, viz:

Wages of two log furnace men 7 months, at \$22 per month	\$308
Wages of one chopper 3 months, at \$15 per month	- 45
Provisions for the above, at \$6 per month	- 102
Paid for building log furnace	- 60
Paid for building ash furnace	- 100
Wood for the latter—16 cords for every 5 ton of ore—86 cords at 150 cts. per cord	- 129
Wages of 6 hands 3 weeks at ash furnace	- 112
Hire of oxen, cart, and driver, 4 months, at 150 cts. per day	168
Tools, liquor, &c. &c.	- 36

\$1,060

Or about \$4 per ton.

This estimate is predicated on the smelting of only 270 tons at one furnace per annum, and only to be charged three times a week. At present it is calculated that five men can smelt at least 500 tons in a year at one furnace; but admitting Judge Jones' estimate of \$4 expense on smelting each ton, the profit will be as follows:

500 tons of ore will produce at least 300 tons of lead—worth at Potosi \$110 per ton	- -	\$3,300
The digger is paid at the rate of 800 wt. of lead for each ton of ore delivered to the Smelter—this at \$110 will amount to	- - -	22,000
The United States' rent $\frac{1}{10}$ lead made—30 tons	-	3 300
Expenses of smelting at \$4 per ton	- -	2,000
		<hr/> \$27,300

Profit to Smelter

\$5,700

The smelting is chiefly performed by slaves. It is sufficiently obvious that the Smelter's profits are considerable, from the eagerness they seek to obtain the ore. The above statement makes the profit of the Smelter a little upwards of \$11 per ton. The only capital invested is for a few tools, cart, &c. if the Smelter pays the Miner money for his ore, and ships the lead to the Atlantic cities, he generally makes a clear profit of \$20 per ton on the lead, by the shipment, after paying freight and all other charges.

Miner's Profits.

As before stated, the miner or digger is paid at the rate of 800 wt. of lead for each ton of ore he digs; very large amounts are frequently earned by the miners in a little time. I have, myself, seen common laborers earn fifteen dollars in a day; and instances are frequent, where much larger sums are earned. It is my belief, from what I have seen, that a miner will earn at least a dollar a day throughout the year; and this is also the opinion of others who have resided a long time in the country. Schoolcraft states, in his view, &c. from the authority of those long conversant in the business, that a miner will average one cwt. of ore a day throughout the year; this would be \$2 25; but let us take my estimate, of one dollar, and what part of the United States affords such wages to laborers? Mr. Austin states, "it was *not uncommon* for a miner (at the 'new diggings,') to raise from \$20 to \$60 worth of ore in a day!"

The habits of the miners are so erratic, that it is impossible to estimate their number; from the best information, I am induced to believe, about two thousand persons are engaged, in all the branches, mining, smelting, and transporting; a part of their time is devoted to farming.

Transportation.

The lead is transported in carts and wagons to the river Mississippi; there are at present three places of depot.

St. Genevieve, distant from Potosi, 45 miles.

Herculaneum do do 36 do

Cliffs of Selma do do 33 do

The roads are pretty much in a state of nature; they are along the ridges and high grounds, and the soil is generally well adapted for good roads. I have before observed, that the town of Potosi is central as respects the mines; I would earnestly recommend the appropriation of a portion of the present year's rent of the public mines to making a good road from Potosi to the Mississippi. It will facilitate the transportation of lead, and will not require a large sum to be expended. The country is poor, and individuals cannot be expected to do much towards such objects; and it would have a beneficial effect in many respects.

Value of the mineral lands to the Government.

Upon this part of my report I feel somewhat at a loss. I am desirous of not overrating, and yet of giving a due estimate: a few facts will assist in elucidating the subject.

The land at present reserved from sale, on account of appearances of lead ore, may be estimated at 150,000 acres. The amount now under lease is about 9,000 acres, leaving unoccupied 141,000 acres. It is not to be supposed that all this extent of surface will afford lead ore in large quantities; but, from past experience from similar

geological and mineralogical features, we know, that it will afford ore more or less. The most productive mine in Missouri, (Shibboleth,) does not extend over more than thirty acres, and none of the shafts, or pits, are deeper than sixty feet.

The mine "Ishmael" leased to the late Col. Wm. M. Perry, has produced about a million of ore in a year. This does not cover more than *ten* acres

The "Pidgeon Roost" mine leased to Mr. S. Perry, will produce about half as much in the same time. This does not extend over more than *four* acres.

These two mines will pay a rent to the United States of \$5,000 worth of lead the first year.

I have quoted freely from the late Mr. Austin's report to Mr. Meigs, on the subject of the lead mines, because I found his statements generally correct, and some of his predictions fulfilled to the very letter; and because he states what he has said upon mines and mining, "is the result of an experience of twenty-five years,"—(eighteen years in Missouri.)

With respect to the revenue which may be expected to be derived from the mines, Mr. Austin, after noticing two or three in particular, observes, "all the other mines spoken of, (thirty-three) have produced some in greater, others in a less degree, all of which would, under proper leases, have yielded a valuable revenue to the government. Taking into view the mines now opened, and such as undoubtedly will be opened, under a regular system, the revenue may, in my opinion, be raised to forty or fifty thousand dollars per annum: as the population increases so will the miners, and, consequently, the mines. But you are to understand that every thing depends upon a new order of things. Lessees must be supported in the quiet possession of their leases—intruders must be removed. The produce of leases heretofore falls so far short of what I have stated the revenue may be raised to, that an explanation may be expected. In the first place, you are to understand, that lessees under the government, have not been properly supported in their leases: It has, *invariably*, been the case, that they have been involved in law suits and personal vexation, and in some cases the leases have been abandoned altogether. Secondly, the leases have been very injudiciously granted; but here let me say, that it is not my intention to call in question the good intentions of the public Agent, (Mr. Bates): there is no man acting under the authority of the government for whom I have a greater respect, and to whom I think the government are more indebted for faithful services; yet I am compelled to say, that, in the business of the mines, he has greatly misjudged, in leasing all the public mines contained in this report, to a man whose ability doth not extend to the working of more than one with energy. It therefore results, that every miner in Washington county must become tributary to this "Farmer General," or abandon mining. The consequence of this arrangement is, that the revenue from all the mines is not greater than would be received from each of them, di-

vided into thirty or forty leases. So long as such a state of things exists, no valuable revenue can be expected. These observations will apply to all the mines. Had the government entered into a regular system of leasing and working the mines, in 1804, the revenue might have been benefitted at this time not less than four or five hundred thousand dollars. At that time there were no intruders, and any system the government had deemed expedient, would have been acceptable, provided it held out reasonable advantages, but will now be attended with some difficulty, inasmuch as the practice of trespasses has been so long continued with impunity, that the most reasonable restrictions will, I am apprehensive, give the government some trouble; but once established, all opposition will vanish. Whatever system the United States may think proper to adopt, must be carried into execution by an Agent at the mines."

Again, Mr. Austin states: "Were the government to say they would take \$500 per acre, for mineral land, few men would be willing to give that sum, or the half it; and yet I have seen fifty feet of ground produce that amount of mineral in a month, with the labor of two or three miners; and again the same number of hands may labor with the same assiduity, and not make *over* common wages. From this state of facts, it is impossible to estimate their value: that it is immense, no one will deny; nor can they be exhausted for ages, if properly managed. Nothing is wanting to make them productive to the United States, but a judicious system."

The discoveries now making, (1825,) are principally upon public land. The terms offered by the government, are very advantageous to the lessees: this is sufficiently obvious from the number of leases taken in so short a time, (thirty-four in one year;) the great number of applicants, consisting of the most respectable inhabitants, and the unremitting activity of search for discoveries of ore.

Individuals are now certain of receiving the reward of their exertions, in being able to obtain quiet possession of their discoveries, under a lease, and if unsuccessful, they lose but their time and labor, as no capital is required under the present system of working the mines. In this manner the whole mine country will be searched; a full development of the extent to which lead ore exists in it, be obtained; a large amount of lead accrue to the government, (the only expense a few contingencies,) and the miners and smelters make large profits.

It has been frequently urged, that were the mines the property of individuals, they would be better wrought, and produce more lead. I beg leave to dissent from that opinion; and in support of this dissent, would remark, that there are many causes operating to prevent scientific mining in Missouri, at this period.

First, The absence of capital, science, and practical skill in the art of mining.

Second, The scarcity and high price of labor.

Third, The extreme facility of obtaining large quantities of ore near the surface of the earth.

Fourth, There are a number of mines private property, and have been such for many years. and yet they are not better wrought, nor do they produce more than the public mines.

Those persons who lament the absence of regular mining in Missouri, will, no doubt, be pleased to hear, that for the quantum of labor bestowed, the mines of Missouri produce more, and yield greater profits than any mines in the world, if we are to believe the writers on the subject of mining.

The produce of the mines of Missouri is about \$300.000 per annum; this is distributed in a small district; it is the interest of five millions of dollars, and not one dollar is invested in permanent works. A few years will double this amount, and probably triple it.

Fortunately for the inhabitants of the mine country, the lead ore is found in large quantities near the surface: it requires no deep excavations nor expensive works, so long as these beds or floats of ore are to be found near the top of the earth. The miner of Missouri will make large wages; and from the quantity of land which remains to be searched, there appears to be no cause to fear that deep mining must be resorted to for some years at any rate. The miner, working on his own risk, seeks the ore where easiest obtained; he understands his own interest, and will not go deep into the bowels of the earth without an absolute necessity for so doing.

In estimating the value of the mineral lands, we should never lose sight of the fact that it is the *surface* only which is producing such quantities of ore. A few years will fully develop the immense value of the mine country, and if it is then deemed advisable to sell it, it will certainly bring more money than at present; and, in the mean time, the Government will accumulate a large quantity of lead, sufficient for its wants for many years.

Lead Mines on the Upper Mississippi, at the River au Ferre, at its vicinity.

On ascending the Mississippi River from St. Louis, the first primitive limestone (in which the lead ore is found) I observed was on the right bank, about twenty miles above Rock Island. the cliffs on the bank having hitherto been entirely of secondary limestone, containing marine remains similar to that at St. Louis, and below that town.

The mineral hills are observed approaching the river obliquely. and cross it extending into Illinois. From the best information I could obtain, I am induced to believe this chain of mineral hills extends over the country, watered by the Gasconade. Northwest of Potosi, crosses the *Missouri River* into Calloway county, (see map,) and keeps a Northerly course, crossing the rivers Des Moines and Ioway, and finally the Mississippi, above Rock Island. as I have stated. There may be spurs diverging from this course, but the main chain will be found as I have stated.

About one hundred miles above Rock Island, (five hundred above St. Louis,) we find Apple, Small Pox, Fever, and Sasinawa Rivers: they are small streams of pure water, fed by living springs. In this vicinity are the lead mines commonly termed the "Fever River Mines."

These mines are different from most of those in the vicinity of Potosi. The ore is obtained in regular veins in the rock, and generally in large quantities for the amount of labor bestowed. It is of various qualities, mostly a very pure galena, free from any foreign matter except a small portion of iron; there is no sulphate of barites whatever, which is so common in Missouri. The large veins of ore are found running almost a due East and West course; there are smaller ones running North and South; so that in making searches for the large veins, the small ones generally yield sufficient to pay good wages to the miners. When the large veins are found, the profit is immense. The smelters have paid from \$500 to \$3,000 for these discoveries of large veins. The last time I ascended the River, a common laborer of St. Louis was in the boat; he had been at work at the mines less than two months, when he made a discovery of ore, which, it has been reported to me, he sold for 1,300 dollars.

The face of the country is broken and elevated, generally prairie; there is some excellent land. The diggings, or mines, are situated from one to ten miles from the River au Ferre, where the furnaces are established. Fuel is easily obtained by means of the river. The smelting establishments are immediately on the bank of Fever River, about six miles from its mouth. The steam boats which ascend the Mississippi in the Spring of the year, come close to the lead furnaces, and keel boats, at all seasons, when not impeded by ice. Transportation costs less from the Fever River mines to St. Louis, than from the mines near Potosi to the depots on the Mississippi.

There were about thirty miners at Fever River when I first visited them in March last; the business was laboring under some embarrassments; after the removal of which, the number of miners began to increase, and has continued to do so. There were, on the 30th of September last, upwards of an hundred. I am fully of the opinion that the quantity of lead made in 1825, (about a million of pounds,) will be but about half the amount which may be expected in 1826.

The mines are near the North boundary of the State of Illinois; it is doubtful whether they are within the bounds of that State, or the Territory of Michigan. As the population is increasing, civil law is requisite; it is, therefore, very desirable that some provision be made for running this part of the boundary line of Illinois and Michigan.

The whole vicinity is mineral land, and it is said to continue to the Ousiconsin River, about an hundred miles from Fever River.

Dubukes' celebrated mines are on the West bank of the Mississippi River, about fifteen miles from Fever River; the geological appearances of which are precisely the same. Dubuke's mines are wrought for a short period of the year, by the Sac and Fox Indians, who de-

rive much benefit from them in trading the ore to the white smelters. The squaws are the principal miners, and they frequently smelt the ore in small temporary furnaces, erected at the side of a bank of earth. They invariably obtain more metallic lead than the whites from the first process, (the log furnace;) the cause is sufficiently obvious: the whites apply too great a fire when first lighting up the furnace.

I was not enabled to visit the mineral lands in the district of Shawanee Town, Illinois, but propose to do so in the Spring. The reservations there were made by the surveyors, and are considerable.

With respect to the specimens of minerals, I would suggest the propriety of sending them to the Military Academy at West Point. The collection is small, but I propose to continue it.

Concluding Observations.

In reflecting on the measures of the Government with respect to the public mines, we should view the subject in all its bearings, and we will then find, that, so far from the system of leasing being based upon narrow pecuniary views, it is the reverse.

First. As a part of the general system of protecting domestic resources, the duty on lead imported from abroad was doubled in the tariff of 1824. This enabled the miners and smelters of Missouri to enter into competition with the foreign lead, and they will eventually drive it from the market. That such is the case the following facts will prove: Previous to the new tariff, lead was selling at four cents at the depots in Missouri; on the passage of the tariff bill it rose to 5 cents per pound, and has since gradually risen to 6½ cents, its present price; and such is the constant demand in the Atlantic cities, that the manufactories of shot have not been able to procure enough lead (at Herculaneum, &c.) This is occasioned by the profit on shipping lead to the Atlantic cities, affording a profit, at the present prices, of twenty dollars per ton. It would be supposed the foreign lead could now be introduced, as the rise in price is more than the increase of duty; this undoubtedly would be the case, but lead has risen in Europe also. The Chancellor of the Exchequer, when proposing in Parliament, during the past year, to *reduce* the duty on lead imported into Great Britain, gave, as a reason, that the rise in price was equal to the proposed reduction, one cent per pound.

Second. The miners and smelters of lead having a protecting duty of twenty-five per cent. (the duty is two cents, and lead is now eight cents per pound,) and are only charged a rent of ten per cent. on the public mines. It is not proposed to increase this rent, but surely complaints of the terms come with an ill grace, when it is seen that the rent is but two-fifths of the amount of the protecting duty. The whole mine country is thrown open, and every inhabitant can obtain a lease.

Third. Were the Government to prohibit working the public mines under leases, and offer the mines for sale, the present inhabitants of

the district, who are destitute of capital, could not of course be the purchasers. It would be the large capitalists of other sections who would become the owners, and the present inhabitants would have to labor on such terms as the proprietors chose to afford. It is not to be supposed that terms as liberal as those of the Government, would be given by individuals. Of this fact, if I am not in error, the present population of the mine district are becoming aware; they are certain of obtaining leases on liberal terms from the United States, but they are by no means certain that *they* would obtain the mines if offered for sale.

Viewing the present system of leasing the public lead mines as a part of the great plan of developing the resources of our country, and keeping the foreigner from competing with our own citizens, is a correct and fair view of the case. It is certain, that if the duty on lead had not been increased in 1824, the Missouri lead could not keep the foreign lead out of the market; and it is equally certain, that the amount which would have accrued to the Treasury on the foreign lead, is more than the rent received from the public mines, and, consequently, the difference is paid to the miners and smelters of Missouri.

MARTIN THOMAS,

Lieut. U. S. Artillery on Ordnance Duty.

The first part of the paper is devoted to a general discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The author discusses the various theories of the origin of life, and shows that the most probable one is the theory of spontaneous generation. This theory is based on the fact that life is everywhere, and that it is not possible to explain its origin by any other theory.

The second part of the paper is devoted to a detailed discussion of the theory of spontaneous generation. The author shows that this theory is based on the fact that life is everywhere, and that it is not possible to explain its origin by any other theory. He also shows that the theory is based on the fact that life is everywhere, and that it is not possible to explain its origin by any other theory.

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